

1. Notes about the examination:

- The examination should take about about an hour and a half.
- Part of the exam is “multiple choice”, and part of it is “show your work”. (You will **not** need a ScanTron[®]).
- The exam will be taken in the Testing Center [please go [here](#) for more information], and will be open Thursday, February 2 and Friday, February 3.
- You will have a choice of doing 10 out of 12 multiple-choice questions (worth 4 points each), and 6 out of 8 show-your-work problems (worth 10 points each). You must **SHOW YOUR WORK** where appropriate to receive full credit for a problem.
- Please do all of your work on the white paper provided – the only things that should be on the examination paper itself are your name and (possibly) circled answers.
- **No cell-phone calculators** will be allowed in the Testing Center!
- Good luck (if you are depending on luck)!

2. Definitions:

Chapter 1: {comparison, operation} symbols, order of operations, set, element, subset, empty set, union, intersection, real number, intervals, subsets of the real numbers, prime, composite, {additive, multiplicative} inverse, absolute value, properties of the real numbers, least common denominator, real number arithmetic

Chapter 2: linear equation in one variable, solution, solution set, equivalent equations, {Addition, Multiplication} Property of Equality, {variable, constant} term, formula, applications, interest, principal, linear inequality in one variable, closed interval, open interval, half-open interval, endpoints, {Addition, Multiplication} Property for Inequalities, absolute value equations, absolute value inequalities

Chapter 3: ordered pair (x, y) , coordinates, x -coordinate, y -coordinate, x -axis, y -axis, origin, rectangular coordinate system, xy -plane, quadrants, plot, linear equation in two variables, standard form $Ax + By = C$, x -intercept(s), y -intercept(s), rise, run, slope m of a line, vertical line, undefined, parallel lines, perpendicular lines, equation of a line, Point-Slope form $y - y_1 = m(x - x_1)$, Slope-Intercept form $y = mx + b$, Standard Form, linear inequalities in two variables, boundary line, test point, relation, function, value, domain, range, Vertical Line Test, function notation $f(x)$, independent variable, dependent variable, sum $f + g$, difference $f - g$, product fg , quotient $\frac{f}{g}$, composition $f \circ g$ of a functions, {direct, inverse} variation, constant k of proportionality, joint variation

3. Be familiar with Chapter 1 concepts

ex: Evaluate $\frac{(5 + 3) \times 11 - 2^3}{14 - (16 \div 2^2)}$

ex: If $A = \{1, 2, 4, 6, 7, 9, 10\}$ and $B = \{1, 3, 4, 6, 7, 8, 10\}$, then what is $A \cap B$ and $A \cup B$?

ex: Write the interval $-4 \leq x < 6$ in three forms.

ex: Simplify $\frac{2}{7} - \frac{1}{5} \times \frac{4}{9}$

4. Solve linear equations in one variable

ex: $7 - (2x - 1) = 10$

ex: $\frac{y}{9} + \frac{4}{3} = \frac{2y}{9}$

5. Work with formulas

ex: In the formula $A = P \cdot \left(1 + \frac{r}{n}\right)^{nt}$, what is the value of P if $A = 190.73$, $r = 0.023$, $n = 4$, and $t = 1.5$?

ex: In the formula $y = \frac{a + d - 1}{3x}$, solve for d

6. Solve story problems

ex: The length of a rectangle is 1 foot more than twice the width. The perimeter is 20 feet. What are the dimensions of the rectangle?

ex: A teacher has a salary of \$35,900 for her second year on the job. If this is 3.4% more than her first-year salary, how much did she earn her first year?

ex: Steve requires \$5000 per year in extra income. He has \$70,000 to invest. He can invest in bonds paying 8% per year, or in CD's paying 5% per year. How much money should be invested in each to realize his goal?

7. Solve inequalities in one variable (**Three forms**)

ex: $5 - (3 + 2x) \geq 6$

8. Solve absolute value equations (**Solution set**)

ex: $5 \cdot |3 - y| + 2 = 7$

ex: $|3 - 5z| = |2 + 3z|$

9. Solve absolute value inequalities (**Two forms**)

ex: $\frac{1}{3} \cdot |2x + 5| + \frac{1}{3} \leq 4$

ex: $2 \cdot (|t + 4| - 3) > -2$

10. Graph equations (use intercepts)

ex: $5y - 2x = 10$

11. Find the slope of a line (**FTSOTLT**)

ex: FTSOTL that connects $(-2, -4)$ and $(6, 3)$

ex: $x = 5.1$; $y = 23.9$

ex: FTSOTL $4x - 2y = 7$

12. Find the equation of a line through (**FTEOTLT**)

ex: FTEOTLT $(5, -6)$ with slope $m = \frac{1}{3}$

ex: FTEOTLT $(-2, -5)$ and $(-8, 5)$

ex: FTEOTLT $(0, -9)$ with slope $m = -\frac{3}{4}$

ex: FTEOTLT $(-4, 8)$ with undefined slope

ex: FTEOTLT $(9, 1)$ with slope $m = 0$

13. Parallel and perpendicular lines

ex: FTEOTLT $(2, -3)$ that is perpendicular to $2x - 7y = 5$

14. Graph linear inequalities

ex: $2x - 6y > 12$

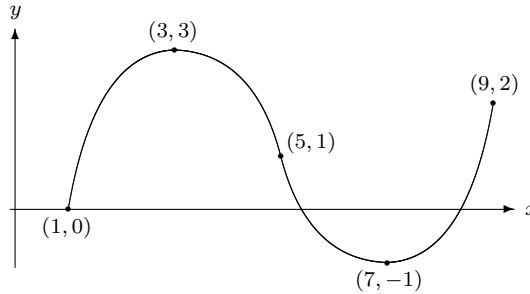
ex: $4x + 3y \leq 18$

15. Determine if a relation is a function

ex: Is the relation $R = \{(3, 5), (-2, 7), (2, 5), (10, 7)\}$ a function?

16. Use the Vertical Line Test to determine if a graph represents a function

ex:



17. Find the intercepts of a function

ex: $f(x) = \frac{x - 6}{5x - 12}$

18. Find the domain and range of a function (**Two forms**)

ex: Find the domain and range of the function $g(x) = 2 \cdot |x + 1|$

ex: (see #16 above)

19. Use function notation effectively

ex: If $\ell(x) = 2x - x^4 + \sqrt{1 - x}$, find $\ell(0)$, $\ell(1)$, $\ell(-3)$, $\ell(2 - x)$ and $\ell(b)$

20. Calculate the sum, difference, product, quotient and composition of two functions

ex: For the functions $h(x) = 2x - 1$ and $j(x) = 1 - x^2$, form $(h + j)(x)$, $(h \cdot j)(x)$, and $\left(\frac{h}{j}\right)(x)$

21. Work with variation

ex: Suppose that annual salary P of an employee varies directly as the years y of experience. If an employee with 4 years experience has a salary of \$24,219.03, how many years experience should an employee making \$37,842.24 have?

ex: Suppose that the age A of a home computer varies inversely as the square root of the speed s of its processor. If a 3-year old computer has a speed of 1.1 GHz, how fast should a 7-year old computer be?